

REMARKS

Claim 8 was objected to informality. Claim 8 is amended to correct the informality. Specifically, Applicants replace “exits” with “exists” in claim 8. Objection of claim 8 is respectfully requested be removed.

Claims 1, 8 and 16 were rejected under 35 USC §103(a) as being unpatentable over Bancroft et al. (U.S. Publication No. 2002/0165638) (“Bancroft”) and Frushour et al. (U.S. Patent No. 4,644,237) (“Frushour”). This rejection is respectfully traversed with respect to these claims as amended herein.

Independent claims 1, 8 and 16, as amended, recite a robot control device, method and a program that recognizes the designation content of a designator based on collected voice and a captured image. The claimed invention estimates the current position of the robot and obtains the position of an obstacle registered in a map data base. Based on the current position of the robot and the position of the obstacle, the claimed invention decides the movement ease of the robot to a specific position required by the voice and image recognition. For example, claim 1, as amended, recites (with emphasis added):

a map data base for retaining map data registering at least the position of an obstacle,
wherein the position of the obstacle is recognized by a group of intersections between a plurality of lines from the current position of the robot and the surface of the obstacle;
a decision part for deciding whether the movement to a specific position is required based on the recognition result of the voice recognition part and image recognition part;
a movement ease decision part for deciding movement ease to the specific position based on the current position of the robot estimated by the self-position estimation part and the position of the obstacle from the map data base responsive to the movement to the specific position being required, wherein the current position of the robot indicates at least one of a warning area, a margin area and a safety area in which the robot exists, and each of the warning area, the margin

area and the safety area is set based on the distance between the current position of the robot and one or more intersections associated with the position of the obstacle;

The current position of the robot indicates at least one of a warning area, a margin area and a safety area in which the robot exists, and each of these areas is set based on the distance between the current position of the robot and the obstacle. Support for this amendment is found throughout the specification, including, for example, pages 32-35 and FIG. 7.

These aspects of the claimed invention are not disclosed or suggested by Bancroft alone or in the combination suggested by the Examiner. At best, Bancroft merely discloses a robot system in a retail environment (Abstract). The Examiner acknowledges that Bancroft does not disclose the warning area, margin area and safety area, and depends on Frushour to disclose the claim element related to these areas.

However, Frushour does not remedy the deficiencies of Bancroft. Frushour discloses a collision avoidance system for a two-arm robot (Abstract). Specifically, Frushour discloses decreasing the velocity of the trailing arm of a two-arm robot whenever the separation between the arms of the robot travelling along a common path is equal to or less than a predetermined distance (1:51-64 and FIG. 1). The Examiner does not provide exact locations of Frushour for the alleged disclosure of the claimed features (Office Action, page 5). Even if taking the entire Frushour into consideration, Frushour fails to disclose or teach the warning area, margin area and safety area set based on the distance between the current position of the robot and one or more intersections associated with the position of the obstacle, let alone the position of the obstacle is recognized by a group of intersections between a plurality of lines from the current position of the robot and the surface of the obstacle.

Thus, the combined disclosures of these references fails to establish even a *prima facie* basis, including *all* recited elements/steps, from which a proper determination of obviousness can be formed. It is therefore respectfully submitted that amended claim 1 is now patentably distinguishable over the cited art, and that dependent claim 3 which depends from allowable claim 1 is also patentable at least for that reason and for its recited distinctions over the cited art.

Independent claims 8 and 16 (as amended) recite similar as claim 1. Thus, independent claims 8 and 16 are now submitted to be patentably distinguishable over the cited art at least for the reasons discussed above. The dependent claim 10 which depends from allowable claim 8 is also submitted to be patentable at least for that reason and for its recited distinctions over the cited art.

Claims 2 and 9 were rejected under 35 USC §103(a) as being unpatentable over Bancroft and Frushour and further in view of Mäkelä et al. (May 2001) (“Mäkelä”). This rejection is respectfully traversed with respect to these dependent claims as amended herein.

Claims 2 and 9 variously depend from independent claim 1 or 8 which has been described in the above Remarks as being patentable over Bancroft and Frushour. In addition, claims 2 and 9 are further limited by such recitations as “reads the position of the obstacle surrounding the movement route to the specification position ..., sets at least two or more areas based on the distance from the obstacle”

The Examiner admits that the disclosure of Bancroft is deficient regarding setting at least two or more areas based on the distance from the obstacle, and states that this feature is disclosed in Mäkelä. However, Mäkelä does not remedy the deficiencies of Bancroft. Mäkelä teaches a navigation system for an autonomous guided outdoor vehicle and the navigation is based on a fusion of a dead reckoning and transponder position (Abstract). The Examiner cited Section 5.4,

“Obstacle avoidance” on page 581 as allegedly disclosing the claimed feature. However, this portion of Mäkelä merely describes that the vehicle must be able to reduce its speed and stop if an obstacle is detected too close to the vehicle. However, Mäkelä does not disclose deciding the movement ease of the robot to a specific position required by the voice and image recognition based on the current position of the robot and the position of the obstacle, let alone the current position of the robot indicating at one of a warning area, a margin area and a safety area in which the robot exists, in any manner resembling the claimed invention.

Thus, the combined disclosures of these references fails to establish even a *prima facie* basis, including *all* recited elements/steps, from which a proper determination of obviousness can be formed. It is therefore respectfully submitted that dependent claims 2 and 9 are also patentable at least for the reason discussed above and for their recited distinctions over the cited art.

Claims 3 and 10 were rejected under 35 USC §103(a) as being unpatentable over Bancroft and Frushour and further in view of Miura et al. (May 1994) (“Miura”). This rejection is respectfully traversed with respect to these dependent claims as amended herein.

Claims 3 and 10 variously depend from independent claim 1 or 8 which has been described in the above Remarks as being patentable over Bancroft and Frushour. In addition, dependent claim 3 is further limited by such recitations as “... setting an area with a predetermined distance from the warning area as a margin area, wherein the predetermined distance is set by a plurality of characteristics associated with the robot...”

Miura does not remedy the deficiencies of Bancroft. Miura disclose a method for modeling obstacles and free spaces for a mobile robot using stereo vision with uncertainty (Abstract). The Examiner cited the impassable, undecided and passable of Miura (Fig. 3 and

Section 2, page 3369) as allegedly disclosing the claimed warning area, margin area and safety area. However, this portion of Miura merely describes three classifications of the possible relations between two endpoints. None of Miura's classifications discloses the current position of the robot as claimed, and none of Miura's classifications indicates at least one of the areas (e.g., warning area, margin area and safety area) in which the robot exists, let alone each of the areas being set based on the distance between the robot and the obstacle, in any manner resembling the claimed invention. It is therefore respectfully submitted that claims 3 and 10 are now patentably distinguishable over the cited art.

Claims 4 and 11 were rejected under 35 USC §103(a) as being unpatentable over Bancroft and Frushour and Miura and further in view of Tunstel (February 1995) ("Tunstel"). This rejection is respectfully traversed with respect to these dependent claims as amended herein.

Claims 4 and 11 variously depend from independent claim 1 or 8 which has been described in the above Remarks as being patentable over Bancroft and Frushour. In addition, claims 4 and 11 are further limited by such recitations as setting the warning area using the position of a circle "where a distance between representative points of the surface of the obstacle is set as a diameter"

The Examiner admits that the disclosure of Bancroft, Frushour and Miura is deficient regarding setting the warning area using the position of a circle, and states that this feature is disclosed in Tunstel. However, Tunstel does not remedy the deficiencies of Bancroft, Frushour and Miura. Tunstel teaches a fuzzy spatial map representation for mobile robot navigation (Abstract). The Examiner cited Fig. 3 and pages 588-589 of Tunstel as allegedly disclosing the claimed feature. However, these portions of Tunstel merely show the result of fuzzy map representation, where the obstacles were represented as a set of rings. None of Tunstel's

obstacle rings disclose deciding the movement ease of the robot to a specific position required by the voice and image recognition based on the current position of the robot and the position of the obstacle, let alone the current position of the robot indicating at one of a warning area, a margin area and a safety area in which the robot exists, in any manner resembling the claimed invention.

Thus, the combined disclosures of these references fails to establish even a *prima facie* basis, including *all* recited elements/steps, from which a proper determination of obviousness can be formed. It is therefore respectfully submitted that dependent claims 4 and 11 are also patentable at least for the reason discussed above and for their recited distinctions over the cited art.

Claims 5 and 12 were under 35 USC §103(a) as being unpatentable over Bancroft et al. and Frushour and further in view of Nourbakhsh et al. (U.S. Publication No. 2002/0013641) (“Nourbakhsh”). This rejection is respectfully traversed with respect to these dependent claims as amended herein.

Claims 5 and 12 variously depend from independent claim 1 or 8 which has been described in the above Remarks as being patentable over Bancroft and Frushour. In addition, claims 5 and 12 are further limited by such recitations as a plurality of decided behaviors such as movement, movement refusal, and movement with caution.

The Examiner admits that the disclosure of Bancroft is deficient regarding the decided behavior, and states that this feature is disclosed in Nourbakhsh. However, Nourbakhsh does not remedy the deficiencies of Bancroft. Nourbakhsh discloses a socially interactive autonomous robot (Abstract). The Examiner cited the device subsystem portion (Fig. 3 and ¶¶[0038] and [0042]) of Nourbakhsh as allegedly disclosing the claimed feature. However, these portions of Nourbakhsh merely describe that the device subsystem portion is responsible for controlling a

variety of devices, such as sensors, a monitor and the like, in the interaction portion.

Nourbakhsh does not disclose deciding the movement ease of the robot to a specific position required by the voice and image recognition based on the current position of the robot and the position of the obstacle, let alone the current position of the robot indicating at one of a warning area, a margin area and a safety area in which the robot exists, in any manner resembling the claimed invention.

Thus, the combined disclosures of these references fails to establish even a *prima facie* basis, including *all* recited elements/steps, from which a proper determination of obviousness can be formed. It is therefore respectfully submitted that dependent claims 5 and 12 are also patentable at least for the reason discussed above and for their recited distinctions over the cited art.

Claims 6 and 13 were rejected under 35 USC §103(a) as being unpatentable over Bancroft and Frushour and further in view of Perzanowski et al. (February 2001) (“Perzanowski”). This rejection is respectfully traversed with respect to these dependent claims as amended herein.

Claims 6 and 13 variously depend from independent claim 1 or 8 which has been described in the above Remarks as being patentable over Bancroft and Frushour. In addition, claims 6 and 13 are further limited by such recitations as recognizing a specific position from the area of the logical product of the designating area narrowed by the designating range specification part and designating area recognized by the image recognition part.

The Examiner admits that the disclosure of Bancroft is deficient regarding recognizing a specific position from the area of the logical product of the designating area, and states that this feature is disclosed in Perzanowski. However, Perzanowski does not remedy the deficiencies of

Bancroft. Perzanowski discloses building a multimodal human-robot interface (Abstract). The Examiner cited Fig. 4 and pages 17-18 of Perzanowski as allegedly disclosing the claimed feature. However, these portions of Perzanowski merely describe a multimodal interface where the human user communicates verbally with all the robots through a wireless head-set. Perzanowski does not disclose deciding the movement ease of the robot to a specific position required by the voice and image recognition based on the current position of the robot and the position of the obstacle, let alone the current position of the robot indicating at one of a warning area, a margin area and a safety area in which the robot exists, in any manner resembling the claimed invention.

Thus, the combined disclosures of these references fails to establish even a *prima facie* basis, including *all* recited elements/steps, from which a proper determination of obviousness can be formed. It is therefore respectfully submitted that dependent claims 6 and 13 are also patentable at least for the reason discussed above and for their recited distinction over the cited art.

Claim 7 and 14 were rejected under 35 USC §103(a) as being unpatentable over Bancroft and Frushour and further in view of Bischoff et al. (October 1999) (“Bischoff”). This rejection is respectfully traversed with respect to these dependent claims as amended herein.

Claims 7 and 14 variously depend from independent claim 1 or 8 which has been described in the above Remarks as being patentable over Bancroft and Frushour. In addition, claims 7 and 14 are further limited by such recitations as a behavior schedule transmission part for outputting a behavior schedule.

The Examiner admits that the disclosure of Bancroft is deficient regarding transmitting a behavior schedule, and states that this feature is disclosed in Bischoff. However, Bischoff does

not remedy the deficiencies of Bancroft. Bischoff discloses integrating vision, touch and natural language in the control of a situation-oriented behavior-based humanoid robot (HERMES) (Abstract). The Examiner cited pages 1003-1004 of Bischoff as allegedly disclosing the claimed feature. However, these portions of Bischoff merely describe the implementation of the integration HERMES, where a user may define the robot's mission as a list of actions that are to be executed sequentially by the robot (Section 4.3, page 1003). Bischoff does not disclose deciding the movement ease of the robot to a specific position required by the voice and image recognition based on the current position of the robot and the position of the obstacle, let alone the current position of the robot indicating at one of a warning area, a margin area and a safety area in which the robot exists, in any manner resembling the claimed invention.

Thus, the combined disclosures of these references fails to establish even a *prima facie* basis, including *all* recited elements/steps, from which a proper determination of obviousness can be formed. It is therefore respectfully submitted that dependent claims 7 and 14 are also patentable at least for the reason discussed above and for their recited distinctions over the cited art.

Claim 17 was rejected under 35 USC §103(a) as being unpatentable over Bancroft and Frushour and further in view of Nakamura et al. (U.S. Patent No. 6,044,321) ("Nakamura"). This rejection is respectfully traversed with respect to these dependent claims as amended herein.

Claim 17 depends from claim 3, which depends from independent claim 1. Claim 1 has been described in the above Remarks as being patentable over Bancroft and Frushour . In addition, claim 17 is further limited by such recitations as the plurality of characteristics associated with the robot including the size, shape, function, movement speed, braking distance or the like of the robot.

The Examiner admits that the disclosure of Bancroft is deficient regarding the characteristics associated with the robot, and states that this feature is disclosed in Nakamura. However, Nakamura does not remedy the deficiencies of Bancroft. Nakamura discloses an intelligent cruise control system that is capable of maintaining a car-to-car distance to avoid collision (Abstract). The Examiner cited Figs. 3-5 and column 4, line 19 to column 5, line 25 of Nakamura as allegedly disclosing the claimed feature. However, these portions of Nakamura do not disclose deciding the movement ease of the robot to a specific position required by the voice and image recognition based on the current position of the robot and the position of the obstacle, let alone the current position of the robot indicating at one of a warning area, a margin area and a safety area in which the robot exists, in any manner resembling the claimed invention.

Thus, the combined disclosures of these references fails to establish even a *prima facie* basis, including *all* recited elements/steps, from which a proper determination of obviousness can be formed. It is therefore respectfully submitted that dependent claim 17 is also patentable at least for the reason discussed above and for their recited distinctions over the cited art.

Entry of this amendment, which is submitted to condition this application for allowance, is respectfully requested.

Respectfully submitted,
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